

REMARKS

The present amendment and remarks are submitted in response to the Official Action dated March 18, 2003.

Applicants affirm the prior telephone election of the Group I claims 1 -6, 16 - 22, and 26 for prosecution in this application.

Claims 1 - 26 are pending in this application. Of these, claims 7 - 15 and 23 - 25 stand withdrawn from consideration in view of the above election. Therefore, claims 1 - 6, 16 - 22, and 26 are active, with claims 1, 16, and 26 being independent. Claims 2 - 6 are directly or indirectly dependent upon claim 1 and claims 17 - 22 are directly or indirectly dependent upon claim 16.

Claims 1 - 5, 16 - 20, and 26 have been rejected for anticipation under 35 USC § 102 (b) and claims 6 and 21 - 22 have been rejected for obviousness under 35 USC § 103 (a). Claim 26 has been amended by this amendment.

For the following reasons, this application, as amended, should be allowed and passed to issue.

The 35 USC § 102 (b) Rejections

1) Claims 1 - 5 and 16 - 20 were rejected under 35 USC § 102 (b) as "clearly anticipated" by U.S. Pat. 6,086,962 (Mahoney et al.).

In stating the basis for rejection predicated on Mahoney et al., the Examiner referred to Table 3, Run 418-10 and, in essence, opined that the prior art product disclosed in Table 3, Run 418-10 of the reference is "substantially identical in structure or in composition" to the claimed products, whereby "a case of anticipation or a prima facie case of obviousness has been established and the burden of proof is shifted to applicant to

show that [the] prior art products do not necessarily or inherently possess the characteristic of a claimed product, whether the rejection is based upon 'inherency' under 35 USC 103 or on 'prima facie obviousness' under 35 USC 103 jointly or alternately".

The above rejection for anticipation under 35 USC 102 (*via* "inherency") or under 35 USC 103 (*via* "prima facie obviousness") is traversed as improper, unwarranted, and untenable for the following reasons.

The Examiner relies upon data contained in Table 3, Run 418-10 of Mahoney et al. for positing that the C:H product of that run inherently possesses or renders obvious all of the characteristics or properties possessed by the instantly claimed materials and recording media comprising the material as a protective overcoat layer. While the Examiner does not point to a specific item in the Table, applicants' reasonable inference is that the Examiner bases his conclusion of inherency or obviousness on the closeness of the peak value of the Raman G-band of the C:H product material, i.e., 1554 cm^{-1} , to that of the instantly claimed C:H materials, i.e., about 1553 cm^{-1} .

However, the similarity in position of the Raman G-band peak is indicative only of the amount of diamond-like sp^3 bonding of the reference and instantly claimed C:H films, and is not indicative of similarity of various other pertinent properties of C:H films, e.g., electrical resistance, corrosion resistance, tribological properties, etc. As a consequence, it is strongly urged that reliance upon similarity of a single property or characteristic of the reference and instantly claimed films and/or products for positing inherency or obviousness of all properties or characteristics of the subject films or products is untenable, unsupported, and improper.

Moreover, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). Clearly, the Examiner's assertion that the prior art and instantly claimed C:H films are inherently the same (i.e., with respect to all relevant properties or characteristics) or obvious therefrom is without basis or merit.

More specifically, the Examiner's analysis appears to disregard the clear teachings of applicants regarding the shortcomings and disadvantages of ion beam-deposited ("IBD") C:H films when utilized as protective overcoat layers for thin film recording media, as described at page 4, line 25 to page 5, line 2:

"The use of alternative deposition techniques for developing thinner and harder a-C:H layers having the requisite mechanical and tribological properties has been studied, such as chemical vapor deposition (CVD), ion beam deposition (IBD), and cathodic arc deposition (CAD) techniques. For example, the IBD method can be utilized for forming hydrogenated ion-beam carbon films (referred to herein as i-C:H films) that exhibit superior tribological performance at thicknesses below about 100 Å. However, such films are insulating and, thus, suffer from the above-described drawback of electrical charge build-up during hard disk operation associated with sputtered a-C:H films."

By contrast, the present invention has been made with the express object of obviating the disadvantages/drawbacks associated with conventional sputtered C:H films

and the electrically insulating nature of IBD C:H films. Specifically, according to the present invention, hard, abrasion-resistant, C:H films with film resistances up to about 85 k Ohms (i.e., lower than that of IBD C:H films) and eminently suitable for use as protective overcoat layers for thin film recording media, are made by an entirely different process involving simultaneous sputtering and plasma-enhanced chemical vapor deposition ("PECVD") of the C:H material. As a consequence, the deposited films contain C atoms from two distinct sources, or alternatively, are composed of two distinct types, i.e., sputter-deposited C atoms and PECVD-deposited C atoms. Very significantly, applicants have determined that the properties/characteristics of the sputtered + PECVD deposited C:H films are strongly dependent upon the relative amounts of each type of C atom present in the film.

Specifically, optimal properties of the sputtered + PECVD deposited films are obtained when the amount of C atoms in the deposited C:H film or layer derived from the PECVD component of the simultaneous sputtering + PECVD process is at least about 30 at. % but less than about 50 at. %.

For example, FIG. 3 indicates that C:H films with a desired amount of sp^3 bonding, as reflected by the position of the Raman G-band peak, can be obtained by varying the amount of the C atoms in the C:H films derived from the PECVD component of the process to within about 30 to about 50 at. %; FIG. 4 indicates that the electrical resistance of C:H films can be selected to be within an optimal range by similarly varying the amount of the C atoms in the C:H films derived from the PECVD component of the process to within about 30 to about 50 at. %; FIG. 5 indicates that glide failures of magnetic disks due to surface marks is reduced to zero when the amount of the C atoms

in the C:H films derived from the PECVD component is less than about 50 at. %; and FIG. 6 indicates that a 5 Å lower critical thickness for corrosion protection of recording media under high humidity, high temperature conditions is provided by the simultaneous sputter + PECVD deposited C:H films of the instantly claimed invention.

Since the Examiner's analysis/comparison of the prior art and instantly claimed C:H films fails to take into account or otherwise establish that the prior art C:H films are composed of C atoms derived from sputtering of a carbon target and from PECVD of a hydrocarbon gas, wherein the amount of C atoms in the deposited films derived from the PECVD component is less than about 50 at. %, it is respectfully urged that the Examiner's initial burden of establishing anticipation *via* inherency or obviousness has not been carried forth, and the burden of showing same therefore remains with the Examiner.

In view of the foregoing, it is respectfully urged that the rejection of claims 1 - 5 and 16 - 20 for anticipation under 35 USC § 102 (b) predicated on Mahoney et al. is improper, unwarranted, and lacking viability. Accordingly, withdrawal of the rejection is courteously solicited.

2) Claim 26 was rejected under 35 USC § 102 (b) as anticipated by U.S. Pat. 5,869,186 (Usuki et al.).

In stating the basis for rejection, the Examiner opined that the "means disclosed by Usuki et al. is deemed an equivalent means for protecting a Co magnetic layer", citing Col. 14, lines 1 - 12 and Table 2 of Usuki et al.

The above rejection for anticipation under 35 USC § 102 is traversed as improper, unwarranted, and untenable for the following reason:

Claim 26, as presently amended, specifies the means for protecting a Co-containing ferromagnetic thin film layer from corrosion under high temperature, high humidity environments as comprising a layer of a hard, abrasion and corrosion-resistant material comprising hydrogenated carbon (C:H) formed by a process comprising simultaneous sputter and plasma-enhanced chemical vapor (PECVD) deposition of said hydrogenated carbon (C:H) material, wherein the amount of carbon atoms in said C:H material contributed by the PECVD component of said process is less than about 50 at. %.

As has been indicated above, FIG. 6 demonstrates that a 5 Å lower critical thickness for corrosion protection of recording media under high humidity, high temperature conditions is provided by the simultaneous sputter + PECVD C:H films of the instantly claimed invention. Specifically, when C:H films are below a critical thickness, they lose the capability of protecting underlying Co-containing ferromagnetic films layers from oxidation, i.e., CoO_x formation initiates. The critical thickness is thus a useful measure of the corrosion resistance of the protective overcoat layer, since a C:H film with a lower critical thickness provides greater corrosion/oxidation protection than a C:H film with a greater critical thickness. As is evident from FIG. 6, the critical thickness for C:H films formed by the inventive sputter + PECVD method is 5 Å lower than that for conventional, i.e., sputtered C:H films, indicating that they provide a greater degree of corrosion protection of the underlying Co-containing ferromagnetic films. Moreover,

essentially complete corrosion protection is provided at sputter + PECVD C:H film thicknesses of about 18 Å.

Since Usuki et al. do not disclose or remotely suggest magnetic recording media with a sputter + PECVD-deposited C:H corrosion protective layer, wherein the amount of C atoms contributed by the PECVD component of the deposition process is less than about 50 at. %, Usuki et al. neither anticipates or renders claim 26 obvious.

Accordingly, it is respectfully urged that the rejection of claim 26 for anticipation under 35 USC § 102 (b) predicated on Usuki et al. is improper, unwarranted, and lacking viability. Accordingly, withdrawal of the rejection is courteously solicited.

The 35 USC § 103 (a) Rejections

Claims 6 and 21 - 22 were rejected under 35 USC § 103 (a) as unpatentable over Mahoney et al.

In stating the basis for rejection, the Examiner opined that "it would have been obvious to one of ordinary skill in the art to optimize thickness" of the C:H layer "as taught by the prior art (See Mahoney et al. Col. 3, lines 21 - 27)". The Examiner further opined that it "would have been obvious to one of ordinary skill in the art to select a cobalt alloy in order to achieve high-density recording".

The above rejections for obviousness under 35 USC § 103 (a) are traversed as improper, unwarranted, and untenable inasmuch as dependent claims 6 and 21 - 22 respectively contain at least the limitations of independent claims 1 and 16, and are therefore considered allowable for the reasons given above. Accordingly, withdrawal of the rejections for obviousness under 35 USC § 103 (a) is courteously solicited.

Summary

In summary, the present amendment and remarks address and obviate each of the Examiner's stated rejections contained in the Official Action of March 18, 2003.

Specifically, claim 26 has been amended to include recitations similar to those contained in independent claims 1 and 16 and the rejections for anticipation and obviousness under 35 USC § 102 (b) and 35 USC § 103 (a) predicated on the Mahoney et al. and Usuki et al. references have been demonstrated as improper, unwarranted, and lacking viability.

Accordingly, in view of the foregoing amendment and remarks, it is respectfully submitted that the application, as presently amended, is in condition for immediate allowance. Therefore, favorable consideration and allowance of the application are respectfully requested.

To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such account.

Respectfully submitted,

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